Lab 1 – Beam profiles

Compare the beam profiles as obtained from a phased array when using unfocused and focused (focus at 2 cm) excitation. Moreover, compare these results with the results obtained in case linear array beam forming is implemented on the same array (use a 20 elements sub-aperture).

Evaluate axial resolution, lateral resolution [@ 10, 20, 30 mm], and generated maximum peak pressure.

```
%% Pulse properties
f0=2.0e6;                          % center frequency [Hz]
Bandwidth=0.5e6;                   % -6 dB half-bandwidth [Hz]
Ps=1e6;
% Pressure at the source [Pa]

%% Medium acoustic properties
c0=1500;                           % speed of sound [m/s]
rho0=1000;                         % density of mass [kg/m^3]

%% Numerical domain sizes
Width=0.02;                        % computational domain physical size [m]
Length=0.04;
% computational domain physical size [m]

%% Array geometry – the grid size equals lambda/8
Nelements=40;
Pitch=4;                           % [grid points]
kerf=1;                            % [grid points]
```

Do the same exercise for 1 MHz and compare and discuss the results.